



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 :

H04Q 3/00

A2

(11) International Publication Number:

WO 97/42774

(43) International Publication Date: 13 November 1997 (13.11.97)

(21) International Application Number: PCT/SE97/00663

(22) International Filing Date: 18 April 1997 (18.04.97)

(30) Priority Data:

08/643,803

6 May 1996 (06.05.96)

US

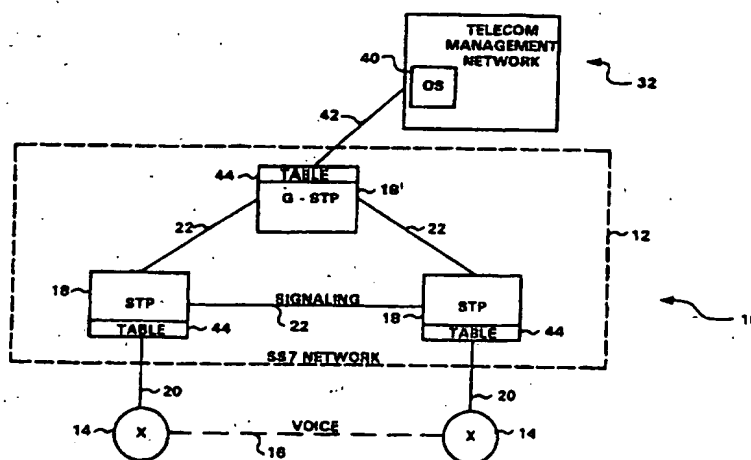
(71) Applicant: TELEFONAKTIEBOLAGET LM ERICSSON  
(publ) [SE/SE]; S-126 25 Stockholm (SE).(72) Inventor: GLITHO, Roch; 4530 Beaconsfield, Montreal,  
Quebec H4A 2H7 (CA).(74) Agent: TELEFONAKTIEBOLAGET LM ERICSSON; Patent  
and Trademark Dept., S-126 25 Stockholm (SE).

(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, YU. ARIPO patent (GH, KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).

## Published

Without international search report and to be republished upon receipt of that report.

(54) Title: TELECOMMUNICATIONS MANAGEMENT NETWORK CONNECTED TO A COMMON CHANNEL SIGNALING NETWORK



## (57) Abstract

A telecommunications management network (TMN) (32) is directly connected for operation and maintenance data message exchange to a common channel signaling network (12). The direct connection to the telecommunications management network is made through a gateway one (18') of a plurality of signal transfer points (18) included within the telecommunications network (10). Addressing and format conversions are effectuated between the transmission control protocol/Internet protocol (TCP/IP) used for the telecommunications management network operation and maintenance messages and the common channel signaling - signaling system No. 7 messages. The telecommunications management network and each of the network element nodes are accordingly assigned both an Internet protocol address and a signaling system No. 7 (SS7) address. Static tables (44) maintained in certain ones of the signal transfer points map Internet protocol addresses and signaling system No. 7 (SS7) address against each other for message routing.

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece			TR	Turkey
BG	Bulgaria	HU	Hungary	ML	Mali	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MN	Mongolia	UA	Ukraine
BR	Brazil	IL	Israel	MR	Mauritania	UG	Uganda
BY	Belarus	IS	Iceland	MW	Malawi	US	United States of America
CA	Canada	IT	Italy	MX	Mexico	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NE	Niger	VN	Viet Nam
CG	Congo	KE	Kenya	NL	Netherlands	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NO	Norway	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	NZ	New Zealand		
CM	Cameroon			PL	Poland		
CN	China	KR	Republic of Korea	PT	Portugal		
CU	Cuba	KZ	Kazakhstan	RO	Romania		
CZ	Czech Republic	LC	Saint Lucia	RU	Russian Federation		
DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		

## TELECOMMUNICATIONS MANAGEMENT NETWORK CONNECTED TO A COMMON CHANNEL SIGNALING NETWORK

### BACKGROUND OF THE INVENTION

#### 5        Technical Field of the Invention

The present invention relates to telecommunications networks and, in particular, to the operation and maintenance Of a common channel signaling network by means of a telecommunications management network.

#### 10        Description of Related Art

In the telecommunications field, two commonly recognized methods exist for sending signaling messages. The traditional telephone mode, referred to as in-band signaling, transmits signaling messages over the same trunk connections as the information messages or calls themselves. The more modern approach, however, utilizes common channel signaling (CCS) in which control messages or signals are carried over one or more separate signaling channels. Common channel signaling typically utilizes a packet-switched network separate from the voice communications network for transmitting call setup and routing packets, as well as other supervisory and control information and application data. The most commonly utilized technology for implementing common channel signaling is the signaling system no. 7 (SS7).

20        It is further well known in the telecommunications field to provide a telecommunications management network (TMN) to monitor and maintain the telecommunication network over which calling services are offered to subscribers. Conventionally, a separate data communications network (DCN) is used to connect the telecommunications management network to each switching node (or other network  
25        element node) within the telecommunication network that is being monitored. The necessity of installing a separate data communications network in order to provide operation and maintenance services to a telecommunications network comprises a significant drawback. There is a recognized need then for a more efficient and less expensive way of transporting operation and maintenance data.

30

-2-

## SUMMARY OF THE INVENTION

The present invention addresses the foregoing and other drawbacks associated with the prior art use of a separate data communications network for providing operation and maintenance services to a telecommunications network. In accordance with the present invention, the separate data communications network for routing operation and maintenance messages to the nodes of the telecommunications network is eliminated. Instead, the existing common channel signaling network is used. A connection is made directly between the telecommunications management network and the common channel signaling network through one of its signal transfer points (STP).

## BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of the method and apparatus of the present invention may be acquired by reference to the following Detailed Description when taken in conjunction with the accompanying Drawings wherein:

FIGURE 1 is a block diagram of a portion of a common channel signaling network;

FIGURE 2 is a block diagram of a portion of a common channel signaling network connected to a telecommunications management network through a separate data communications network;

FIGURE 3 is a block diagram of a portion of a common channel signaling network directly connected to a telecommunications management network; and

FIGURE 4 illustrates the different Open Systems Interconnection (OSI) layers of a common channel signaling - signaling system no. 7 network which supports the transmission of telecommunications management network operation and maintenance messages.

## DETAILED DESCRIPTION OF THE DRAWINGS

Reference is now made to FIGURE 1 wherein there is shown a block diagram of a portion of a common channel signaling (CCS) network 10. The network 10 includes a plurality of exchanges (X) 14 for providing circuit switched connections to voice trunks 16 during the routing and handling of voice communication call

-3-

connections. It will be understood that the network 10 likely includes many more exchanges 10 than the two shown. The network 10 further includes a plurality of signal transfer points (STPs) 18 each comprising a specialized packet switch for receiving and transmitting signaling messages separate from the call connections being handled by the exchanges 14. Each exchange 14 is connected for data communication with at least one signal transfer point 18 over a digital A-link 20. Each signal transfer point 18 is further connected for data communication with at least one other signal transfer point over a digital B-link 22. The signal transfer points 18, digital A-links 20 and digital B-links 22 make up a packet switched, common channel signaling network 12 which preferably comprises a common channel signaling - signaling system no. 7 (CCS-SS7) network. Although not shown to simplify the drawing, redundant pairs of signal transfer points 18 are typically provided in association with each exchange 14, and furthermore multiple digital A-link 20 connections between each exchange and its redundant signal transfer points, as well as multiple digital B-link 22 connections at each signal transfer point, are included to support reliability and robustness within the common channel signaling network 12. Further description of the specific operation of the common channel signaling - signaling system no. 7 network 12 will not be provided herein as such is well known to those having ordinary skill in the art.

Reference is now made to FIGURE 2 wherein there is shown a block diagram of a portion of a common channel signaling network 10 (see, also FIGURE 1) connected to a telecommunications management network 32 through a separate data communications network 34. By way of the separate data communications network 34, the telecommunications management network 32 is connected to each exchange 14 (and any other appropriate network elements - not shown). Operation of the telecommunications management network 32 is controlled by an operating system (OS) 40. The telecommunications management network 32 communicates operation and maintenance (O&M) messages with the exchanges 14 via an interface commonly referred to as Q3. The Q3 operation and maintenance message traffic is carried between each of the exchanges 14 and the telecommunications management network 32 by way of the data communications network 34 which in common practice utilizes a transmission control protocol/internet protocol (TCP/IP) running on top of either a

-4-

local area network (LAN) or wide area network (WAN). An example of a commonly used local area network for the data communications network 34 comprises an ethernet network. An example of a commonly utilized wide area network for the data communications network 34 comprises an X.25 network. Other local and wide area networks of a type known to those of ordinary skill in the art are often used to connect the telecommunications management network 32 to the telecommunications network 10.

Reference is now made to FIGURE 3 wherein there is shown a block diagram of a portion of a common channel signaling network 10 (again, see FIGURE 1) connected directly to a telecommunications management network 32 without the use of a separate data communications network (see, for comparison, FIGURE 2). The telecommunications management network 32 is connected via communications link 42 to a selected O&M gateway signal transfer point (G-STP) 18' which may comprise any conveniently selected one of the plurality of signal transfer points 18 of the signaling system no. 7 network 12. The Q3 operation and maintenance message traffic is thus carried between the telecommunications management network 32 and each of the exchanges 14 via the signaling system no. 7 network 12 and the communications link 42. In this configuration, both the communications link 42 and the signaling system no. 7 network 12 support the transmission of transmission control protocol/internet protocol (TCP/IP) messages. With respect to the common channel signaling system, this is accomplished by having a transmission control protocol/internet protocol (TCP/IP) running on top of the signaling system no. 7 network 12.

Reference is now made to FIGURE 4 wherein there are illustrated the different Open Systems Interconnection (OSI) layers of a common channel signaling - signaling system no. 7 network 12. Signaling system no. 7 has two parts, a user part (UP) and a message transfer part (MTP). The message transfer part (MTP) 300 is the lowest layer of the signaling system no. 7 network, and is used to physically transport packet data. The user part (UP) comes in several varieties, including a Telephone User Part (TUP) for basic telephone service, and an Integrated Service Digital Network (ISDN) User Part (ISUP) for combined voice, data and voice services. These user parts (UP) also utilize the message transfer part (MTP) to provide a connection-less but sequenced

-5-

transport service. Applications (A) residing at the highest layer of the signaling system no. 7 may utilize the Transaction Capability Application Part (TCAP) and the Intermediate Services Part (ISP), comprising the Network-Application Service Part (NASP) layers, along with the Signaling Connection Control Part (SCCP) and Message Transfer Part (MTP), comprising the Network Service Part (NSP) layers, to transport application layer data from one application to another application.

Reference is now made to both FIGURE 3 and FIGURE 4. The telecommunications management network 54 operation and maintenance application (O&MA), also known as Common Management Information Service Element (CMISE), utilizes Transmission Control Protocol/Internet Protocol (TCP/IP) message signals, comprising the Network-Application Service Part (NASP) layers, to interface with the Signaling Connection Control Part (SCCP) and Message Transfer Part (MTP), comprising the Network Service Part (NSP) layers, to communicate operation and maintenance message data over the signaling system no. 7 network 12 between the gateway signal transfer point 18' and each of the exchanges 14. In this connection, the transmission control protocol/internet protocol (TCP/IP) operation and maintenance message signals are encapsulated within a Signaling Connection Control Part (SCCP) message and assigned an appropriate signaling system no. 7 address for directing the end-to-end routing of the message to the specified destination within the signaling system no. 7 network 12. This is accomplished through use of an internet protocol (IP) to Signaling Connection Control Part (SCCP) mapper (IP-SCCP) which utilizes a conversion table (see discussion below) for translating between internet protocol addressed and signaling system no. 7 addresses. The signaling system no. 7 addressing information is used by the Message Transfer Part (MTP) at each signal transfer point (STP) in the common channel signaling system to properly route the message signal. Once outside the signaling system no. 7 network 12, for example over the communications link 42, transmission control protocol/internet protocol (TCP/IP) addressing is used.

To facilitate the foregoing routing functionality, the telecommunications management network 32 and each of the exchanges 14 are assigned both an internet protocol address and a signaling system no. 7 address. The operation and maintenance

-6-

5 applications within the telecommunications management network 32 and the exchanges  
14 use internet protocol addresses to address operation and maintenance messages to  
each other. The messages are then encapsulated within a Signaling Connection Control  
Part (SCCP) message, and static tables 44 in the signal transfer points 18 associated  
10 with the exchanges 14 and the telecommunications management network 32 map the  
designated internet protocol addresses to appropriate signaling system no. 7 addresses  
for message transmission via the signal transfer points 18. Intermediate signal transfer  
points 18 (not shown) in the signaling system no. 7 network 12 need not include a  
static table 44. The signal transfer points 18 thus function as internet protocol routers  
15 in addition to performing their common channel signaling system routing functions in  
connection with the operation of the telecommunications network 10. Once on the  
other side of the signaling system no. 7 network 12, the internet protocol addresses are  
used to complete routing and delivery of the messages. To insure that operation and  
maintenance messages do not unduly burden the signaling system no. 7 network 12,  
20 these messages are assigned a lowest possible priority and are transmitted only when  
load conditions allow.

The common channel signaling system network 10 and its signaling system no.  
7 network 12 have not previously been used for transporting operation and  
maintenance messages between the telecommunications management network 32 and  
25 the exchanges 14. This is perhaps because operation and maintenance is considered  
within the domain of data communications rather than signaling. This artificial  
distinction may have deterred the use of signaling system no. 7 for data transport uses  
even though common channel signaling systems fill many of the requirements for  
transporting data such as operation and maintenance message data. The signaling  
30 system no. 7 network 12 is, however, preferred for use in connection with the present  
invention over the prior art separate data communications network 34 (see, FIGURE  
2) for several reasons. First, the cost conscious service operator desiring to install a  
telecommunications management network 54 need not also invest in and install a  
separate data communications network 34 that is subsequently inefficiently used only  
for operation and maintenance message transmission purposes. Second, the  
transmission of operation and maintenance messages over the signaling system no. 7



-7-

network more efficiently utilizes the available signaling capacity of the existing common channel signaling system. Third, through the digital A-link and B-link connections of the common channel signaling system, the telecommunications management network 32 needs only a single connection through the gateway signal transfer point (G-STP) 18' to reach each individual exchange 14. Other advantages may become apparent through a review of this disclosure and/or are known to those of ordinary skill in the art.

Although a preferred embodiment of the method and apparatus of the present invention has been illustrated in the accompanying Drawings and described in the foregoing Detailed Description, it will be understood that the invention is not limited to the embodiment disclosed, but is capable of numerous rearrangements, modifications and substitutions without departing from the spirit of the invention as set forth and defined by the following claims.

-8-

## WHAT IS CLAIMED IS:

1. A telecommunications system, comprising:  
a telecommunications network including:  
a plurality of network element nodes interconnected by voice trunks;  
5 and  
a common channel signaling system connected to each of the network  
element nodes and configured to carry telecommunications application signals;  
and  
a telecommunications management network connected to the plurality of  
10 network element nodes of the telecommunications network through the common  
channel signaling system, with the common channel signaling system carrying operation  
and maintenance data messages to and from the telecommunications management  
network in addition to the telecommunications application signals.
- 15 2. The system of claim 1 wherein the common channel signaling system  
comprises a signaling system no. 7 network.
3. The system of claim 2 wherein the common channel signaling system  
supports a transmission control protocol/internet protocol running on top of the  
20 signaling system no. 7 network to carry the operation and maintenance data messages.
4. The system of claim 3 wherein the telecommunications management  
network as well as each of the network element nodes is assigned both an internet  
protocol address and a signaling system no. 7 address.
- 25 5. The system of claim 4 wherein the common channel signaling system  
maps internet protocol addresses to signaling system no. 7 addresses to route the  
operation and maintenance data messages.
- 30 6. The system of claim 5 wherein the common channel signaling system  
comprises a plurality of interconnected signal transfer points including a gateway signal

-9-

transfer point through which a connection is made to the telecommunications management network.

5       7.       The system of claim 6 wherein each of the signal transfer points functions as an internet protocol router for operation and maintenance data messages as well as a signaling system no. 7 router for telecommunications application signals.

8.       The system of claim 1 wherein the network element nodes comprise telecommunications exchanges.

10       9.       A telecommunications system, comprising:  
a plurality of voice communications switching nodes interconnected by voice trunks;

15       a common channel signaling system comprising a plurality of signal transfer points interconnected by communications links, wherein certain ones of the signal transfer points are connected to certain ones of the plurality of voice communications switching nodes, and wherein one of the signal transfer points comprises a gateway signal transfer point, and further wherein the common channel signaling system carries telecommunications application signals; and

20       a telecommunications management network connected to the gateway signal transfer point for the communication of operation and maintenance data messages with the plurality of voice communications switching nodes via the common channel signaling system.

25       10.       The system of claim 9 wherein the common channel signaling system comprises a signaling system no. 7 network.

30       11.       The system of claim 10 wherein the common channel signaling system supports a transmission control protocol/internet protocol running on top of the signaling system no. 7 network.

-10-

12. The system of claim 11 wherein the telecommunications management network as well as each of the network element nodes is assigned both an internet protocol address and a signaling system no. 7 address.

5 13. The system of claim 12 wherein certain ones of signal transfer points include a static table mapping internet protocol addresses to signaling system no. 7 addresses.

10 14. The system of claim 13 wherein each of the signal transfer points functions as an internet protocol router for operation and maintenance data messages as well as a signaling system no. 7 router for telecommunications application signals.

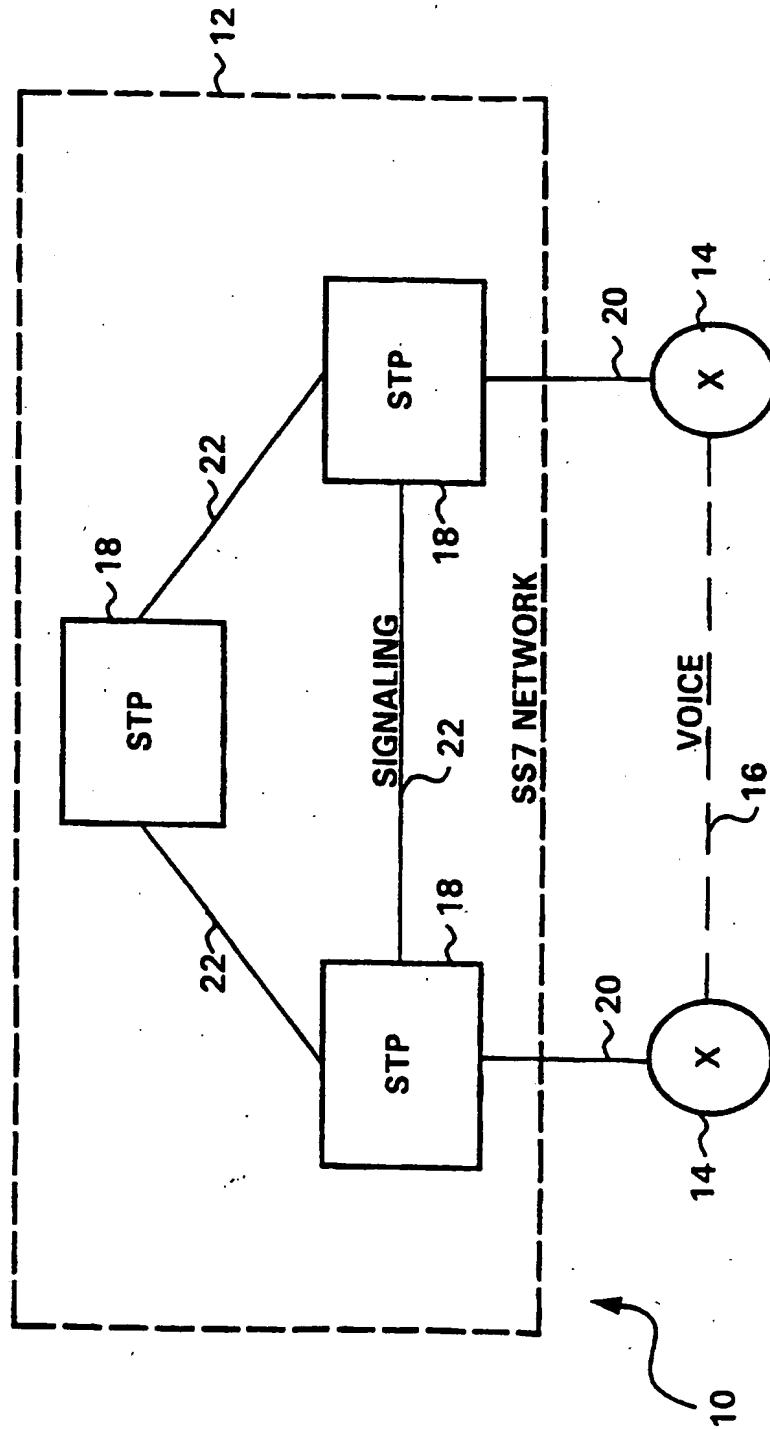
15 15. A telecommunications system, comprising:  
a common channel signaling telecommunications network including a plurality  
switching nodes interconnected via a plurality of signal transfer points; and  
a telecommunications management network connected to said common channel  
signaling telecommunications network via a gateway one of the plurality of signal  
transfer points.

20 16. The system of claim 15 wherein the plurality of signal transfer points are interconnected to form a signaling system no. 7 network.

25 17. The system of claim 16 wherein the signaling system no. 7 network supports a transmission control protocol/internet protocol for carrying telecommunications management network operation and maintenance messages.

30 18. The system of claim 17 wherein each of the signal transfer points functions as an internet protocol router for operation and maintenance data messages as well as a signaling system no. 7 router.

**FIG. 1**  
PRIOR ART



**FIG. 2**  
PRIOR ART

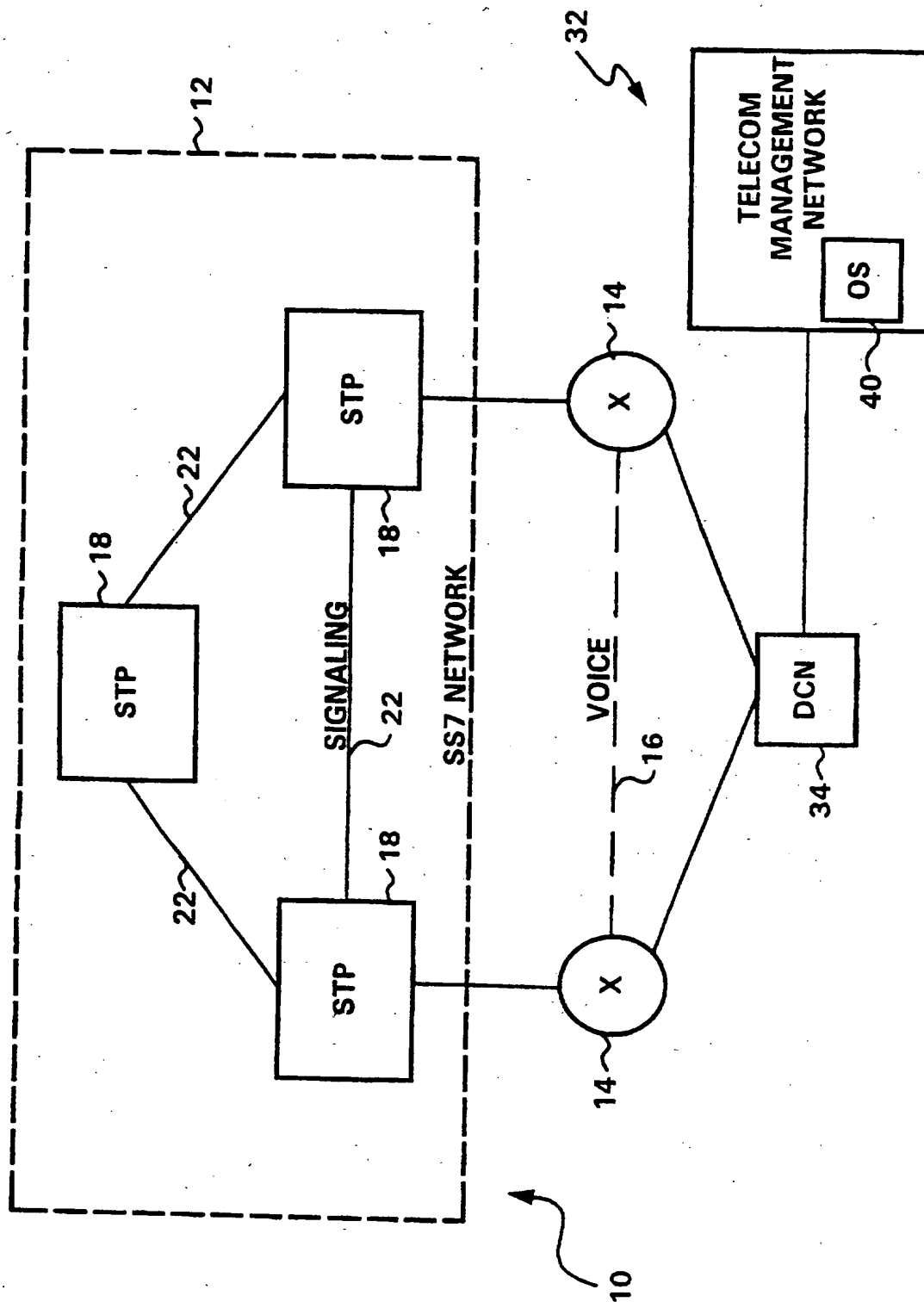
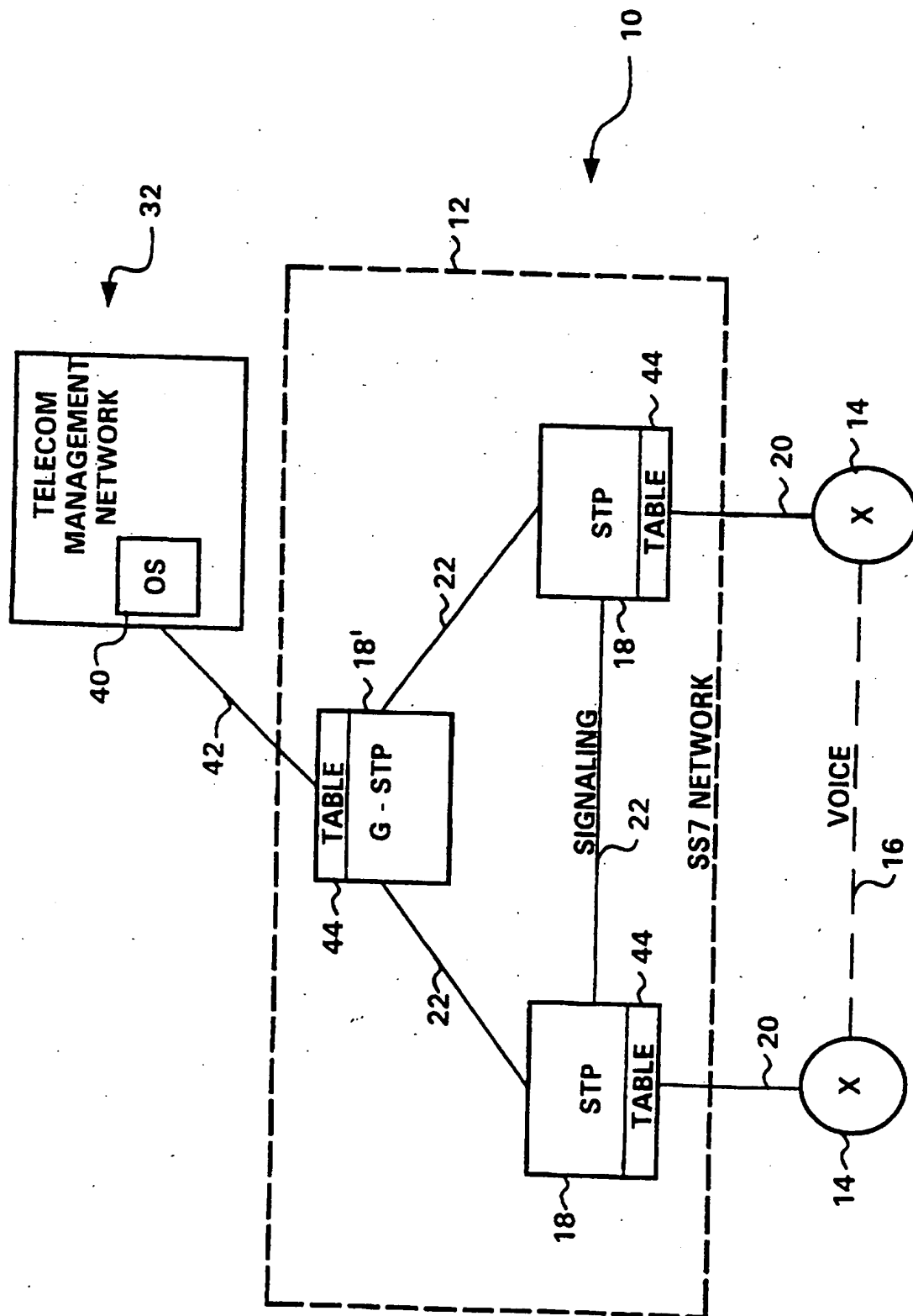
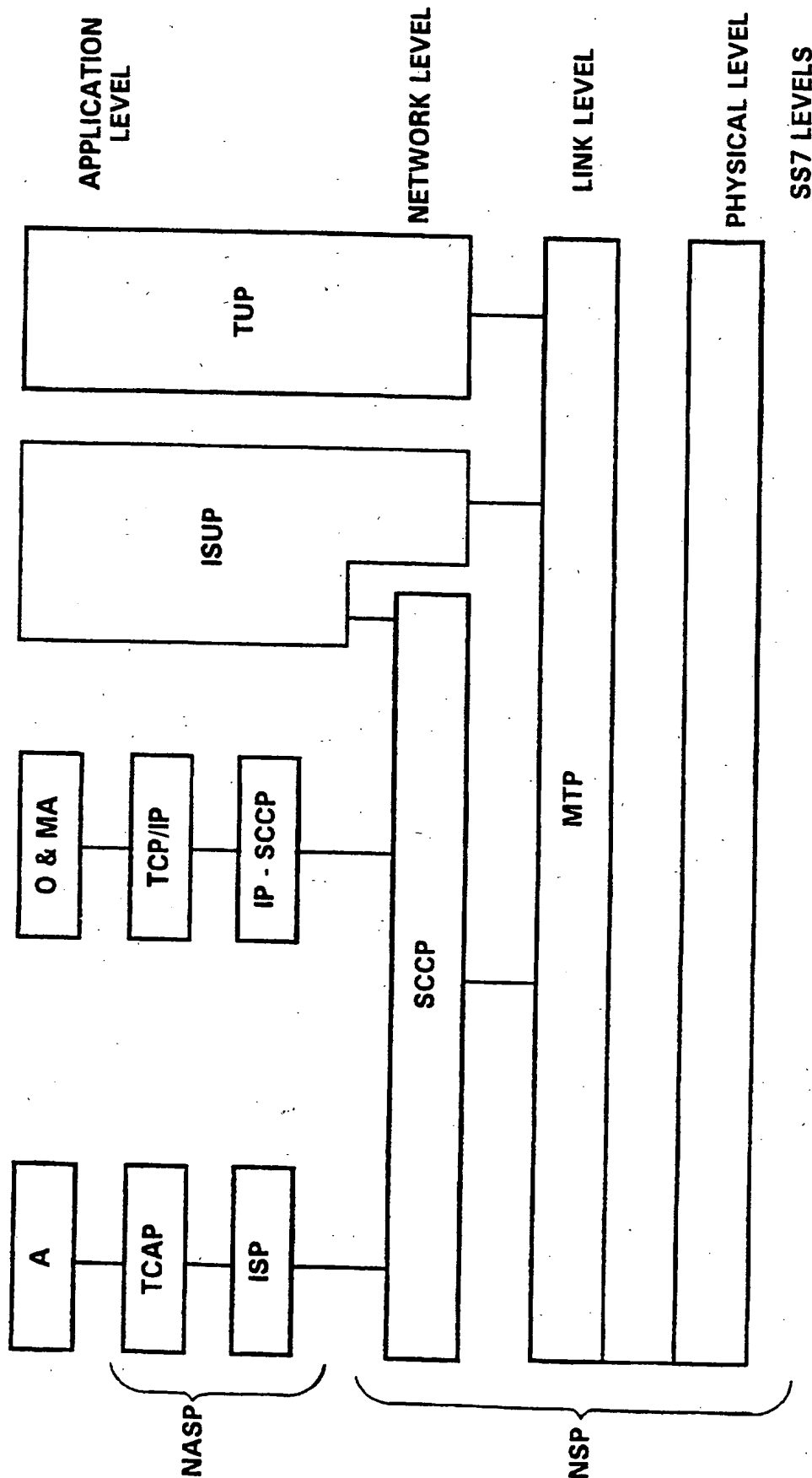


FIG. 3



4 / 4

FIG.4



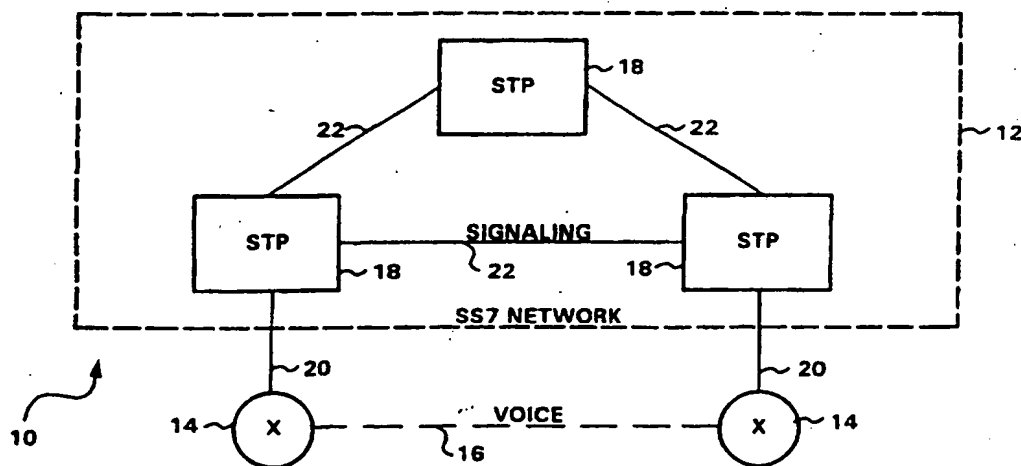




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>6</sup> : H04Q 3/00	A3	(11) International Publication Number: WO 97/42774 (43) International Publication Date: 13 November 1997 (13.11.97)
(21) International Application Number: PCT/SE97/00663 (22) International Filing Date: 18 April 1997 (18.04.97) (30) Priority Data: 08/643,803 6 May 1996 (06.05.96) US (71) Applicant: TELEFONAKTIEBOLAGET LM ERICSSON (publ) [SE/SE]; S-126 25 Stockholm (SE). (72) Inventor: GLITHO, Roch; 4530 Beaconsfield, Montreal, Quebec H4A 2H7 (CA). (74) Agent: TELEFONAKTIEBOLAGET LM ERICSSON; Patent and Trademark Dept., S-126 25 Stockholm (SE).	(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>  (88) Date of publication of the international search report: 8 January 1998 (08.01.98)	

(54) Title: TELECOMMUNICATIONS MANAGEMENT NETWORK CONNECTED TO A COMMON CHANNEL SIGNALING NETWORK



**(57) Abstract**

A telecommunications management network (TMN) (32) is directly connected for operation and maintenance data message exchange to a common channel signaling network (12). The direct connection to the telecommunications management network is made through a gateway one (18<sup>1</sup>) of a plurality of signal transfer points (18) included within the telecommunications network (10). Addressing and format conversions are effectuated between the transmission control protocol/Internet protocol (TCP/IP) used for the telecommunications management network operation and maintenance messages and the common channel signaling - signaling system No. 7 messages. The telecommunications management network and each of the network element nodes are accordingly assigned both an Internet protocol address and a signaling system No. 7 (SS7) address. Static tables (44) maintained in certain ones of the signal transfer points map Internet protocol addresses and signaling system No. 7 (SS7) address against each other for message routing.

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

PCT/SE 97/00663

Form PCT/ISA/210 (second sheet) (July 1992)

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/SE 97/00663

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	PANIGAS B ET AL: "TMN PILOT APPLICATION FUNCTIONS" PROCEEDINGS OF THE INTERNATIONAL SWITCHING SYMPOSIUM 1990, vol. VI, 28 May 1990, STOCKHOLM, SE, pages 147-153, XP000130977	1,2,8
A	see page 147, column 2, paragraph 2 - page 148, column 1, paragraph 3 see figures 1,2	9,10,15,16
X	--- BERTFELT L ET AL: "AN INTEGRATED TMN SOLUTION - ERIPAX AND TMOS" ERICSSON REVIEW, vol. 71, no. 1, 1994, STOCKHOLM, SE, pages 49-56, XP000429344	1,2,8
A	see page 49, column 2 - page 50, column 2, paragraph 2 see figures 1,2	9,10,15,16
A	--- AHRENS M: "KEY CHALLENGES IN DISTRIBUTED MANAGEMENT OF BROADBAND TRANSPORT NETWORKS" IEEE JOURNAL ON SELECTED AREAS IN COMMUNICATIONS, vol. 12, no. 6, August 1994, NEW YORK, US, pages 991-999, XP000491325 see figures 1,2 see page 994, column 1, paragraph 2 -----	3,11,17